

Evaluate Continuing Calibration Report

Data File : J:\ACQUDATA\MSVOA8\DATA\101104\F1124.D Vial: 5
Acq On : 11 Oct 2004 11:43 am Operator: Herring
Sample : CCV Inst : GCMS112
Misc : Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : J:\ACQUDATA\MSVOA8\METHODS\WAT1008.M (RTE Integrator)
Title : 8260voa
Last Update : Mon Oct 11 18:55:59 2004
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
41	Carbontetrachloride	0.355	0.392	-10.4	115	0.00
42	1,1-Dichloropropene	0.443	0.470	-6.1	114	0.00
43	Iso-Butyl Alcohol	0.009	0.009	0.0	109	0.00
44 s	surr1,1,2-Dicethane	0.460	0.520	-13.0	122	0.00
45	Benzene	1.295	1.317	-1.7	113	0.00
46	1,2-Dichloroethane	0.503	0.517	-2.8	116	0.00
47	N-Heptane	0.685	0.701	-2.3	110	0.00
48	Trichloroethene	0.307	0.318	-3.6	115	0.00
49	methylcyclohexane	0.473	0.461	2.5	113	0.00
50 c	1,2-Dicopropane	0.355	0.369	-3.9	115	0.00
51	Methyl Methacrylate	0.195	0.212	-8.7	123	0.00
52	1,4-Dioxane	0.001	0.001	0.0	83	0.00
53	Dibromomethane	0.190	0.202	-6.3	118	0.00
54	Bromodichloromethane	0.443	0.461	-4.1	115	0.00
55	2-Nitropropane	0.120	0.126	-5.0	120	0.00
56	2-Chloroethylvinyl Ether	0.211	0.227	-7.6	130	0.00
57	cis-1,3-Dichloropropene	0.538	0.574	-6.7	117	0.00
58 I	d5 - Chlorobenzene	1.000	1.000	0.0	110	0.00
59	4-Methyl-2-Pentanone	0.389	0.410	-5.4	124	0.00
60 c	Toluene	1.370	1.427	-4.2	115	0.00
61	trans-1,3-Dichloropropene	0.536	0.563	-5.0	119	0.00
62	Ethyl Methacrylate	0.421	0.452	-7.4	120	0.00
63	1,1,2-Trichloroethane	0.246	0.257	-4.5	118	0.00
64 s	surr3, Toluene-d8	1.378	1.548	-12.3	123	0.00
65 s	surr2, bfb	0.550	0.627	-14.0	124	0.00
66	Tetrachloroethene	0.292	0.316	-8.2	115	0.00
67	2-Hexanone	0.260	0.285	-9.6	126	0.00
68	1,3-Dichloropropene	0.544	0.564	-3.7	116	0.00
69	Dibromochloromethane	0.284	0.312	-9.9	118	0.00
70	1,2-Dibromoethane	0.255	0.273	-7.1	118	0.00
71 p	Chlorobenzene	0.800	0.844	-5.5	113	0.00
72	1,1,1,2-Tetrachloroethane	0.291	0.291	0.0	115	0.00
73 c	Ethylbenzene	1.492	1.600	-7.2	113	0.00
74	(m+p)Xylene	0.518	0.570	-10.0	112	0.00
75	o-Xylene	0.506	0.551	-8.9	112	0.00
76	Styrene	0.868	0.969	-11.6	114	0.00
77 p	Bromoform	0.165	0.189	-14.5	123	0.00
78	Isopropylbenzene	1.321	1.449	-9.7	111	0.00
79	Cyclohexanone	0.024	0.018	25.0#	75	0.00

(#) = Out of Range
F1124.D WAT1008.M

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*See DOD Summary Attachment for DOD Specific Criteria

Evaluate Continuing Calibration Report

Data File : J:\ACQUADATA\MSVOAS\DATA\101104\F1124.D Vial: 5
Acq On : 11 Oct 2004 11:43 am Operator: Herring
Sample : CCV Inst : GCMS#
Misc : Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : J:\ACQUADATA\MSVOAS\METHODS\WAT1008.M (RTE Integrator)
Title : 8260voa
Last Update : Mon Oct 11 18:55:59 2004
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

	Compound	AvgRRF	CCRF	%Dev	Area%	Dev(min)
81 p	1,1,2,2-Tetrachloroethane	0.703	0.720	-2.4	117	0.00
82	Trans-1,4-Dichloro-2-butene	0.213	0.229	-7.5	125	0.00
83	1,2,3-Trichloropropane	0.191	0.204	-6.8	122	0.00
84	n-Propylbenzene	3.430	3.625	-5.7	110	0.00
85	Bromobenzene	0.625	0.668	-6.9	116	0.00
86	1,3,5-Trimethylbenzene	2.128	2.293	-7.8	109	0.00
87	2-Chlorotoluene	2.012	2.113	-5.0	111	0.00
88	4-Chlorotoluene	2.347	2.487	-6.0	112	0.00
89	tert-Butylbenzene	1.845	1.930	-4.6	107	0.00
90	1,2,4-Trimethylbenzene	2.086	2.280	-9.3	109	0.00
91	sec-Butylbenzene	2.838	3.020	-6.4	105	0.00
92	p-Isopropyltoluene	2.245	2.384	-6.2	106	0.00
93	1,3-Dclbenz	1.151	1.214	-5.5	113	0.00
94	1,4-Dclbenz	1.174	1.203	-2.5	111	0.00
95	n-Butylbenzene	2.329	2.442	-4.9	104	0.00
96	1,2-Dclbenz	1.100	1.149	-4.5	111	0.00
97	1,2-Dibromo-3-chloropropane	0.099	0.114	-15.2	121	0.00
98	Nitrobenzene	0.000	0.000	0.0	126	0.00
99	1,2,4-Tcbenzene	0.575	0.624	-8.5	113	0.00
100	Hexachlorobu	0.288	0.295	-2.4	100	0.00
101	Naphthalen	1.278	1.562	-22.2#	118	0.00
102	1,2,3-Tclbenzene	0.516	0.587	-13.8	115	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0
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*See DOD Summary Attachment for DOD Specific Criteria

ATTACHMENT III
DOD SUMMARY AND QC CRITERIA

*See DOD Summary Attachment for DOD Specific Criteria

*DOD SUMMARY

For work for the Department of Defense – the DOD Quality Systems Manual must be followed. The DOD Manual is based on the NELAC Standards with some additional requirements. The following are the requirements which are different or additional to routine analysis and must be followed for DOD work:

- Calibration Curve, Linear Regression: The correlation coefficient must be greater than or equal to 0.995.
- The Second Source Calibration Verification (ICV) must have a recovery of 75-125% of the true value.
- The Method Blank must not have any hits above $\frac{1}{2}$ the reporting limit. Common laboratory contaminants must not be above the reporting limit.
- Apply J flag to all hits between MDL and MRL.
- Reporting Limits – “the lowest standard of the calibration establishes the [reporting limit], but it must not be greater than 3 times the [MDL].” DOD QSM, V3, Appendix B-glossary.
- The limits for surrogates, LCS, and MS are different from Appendix C of the QAM. Follow the DOD limits given in the following tables. All DOD targets are “control analytes” for DOD. All DOD targets are spiked and evaluated.

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The lower control limit generated for alternative or modified methods must be greater than 10% to be considered acceptable.

D.6 Surrogates

The surrogate compounds for each method are added to all samples, standards, and blanks to assess the ability of the method to recover specific non-target analytes from a given matrix and to monitor sample-specific recovery. Control limits for these compounds were calculated in the same study as the other analytes on the target analyte lists. Below are the limits for some of the surrogates of Methods 8260, 8270, 8081, and 8082, based on 3 standard deviations around the mean (Table D-3). Control limits are not available for some surrogates that appear on the target analyte lists in Appendix DoD-C. Sufficient data were not received for those analytes during the LCS study to perform statistically significant analyses. No ME limits are presented as marginal exceedances are not acceptable for surrogate spikes. Note: DoD prefers the use of those surrogates not identified as poor performing analytes in Table D-2 above.

TABLE D-3. SURROGATES

Analyte	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
8260 Water:				
1,2-Dichloroethane-d ₄	95	8	70	120
4-Bromofluorobenzene	98	7	75	120
Dibromofluoromethane	100	5	85	115
Toluene-d ₈	102	6	85	120
8260 Solid:				
4-Bromofluorobenzene	101	6	85	120
Toluene-d ₈	100	5	85	115
8270 Water:				
2-Fluorobiphenyl	79	10	50	110
Terphenyl-d ₁₄	92	14	50	135
2,4,6-Tribromophenol	82	13	40	125
2-Fluorophenol	63	14	20	110
Nitrobenzene-d ₅	76	11	40	110
8270 Solid:				
2-Fluorobiphenyl	72	10	45	105
Terphenyl-d ₁₄	78	15	30	125
2,4,6-Tribromophenol	80	15	35	125
2-Fluorophenol	70	11	35	105
Phenol-d ₆ /d ₈	71	10	40	100
Nitrobenzene-d ₅	69	10	35	100
8081 Water:				
Decachlorobiphenyl	83	17	30	135
TCMX	81	19	25	140
8081 Solid:				
Decachlorobiphenyl	94	13	55	130
TCMX	97	9	70	125
8082 Water:				
Decachlorobiphenyl	88	15	40	135
8082 Solid:				
Decachlorobiphenyl	91	11	60	125

*See DOD Summary Attachment for DOD Specific Criteria

D.7 In-House LCS Control Limits

The acceptability of LCS results within any preparatory batch shall be based on project specified limits or the following DoD-specified LCS control limits, if project-specific limits are not available. If DoD limits are not available, the laboratory must use its in-house limits for batch acceptance.

DoD strongly believes that it is important for laboratories to maintain their own in-house LCS limits. These in-house limits must be consistent with the DoD limits (project-specific, if available; otherwise the following LCS-CLs). The laboratory in-house limits shall be calculated from the laboratory's historical LCS data in accordance with a documented procedure (e.g., SOP) that is consistent with good laboratory practice. That document must describe the process for establishing and maintaining LCS limits and the use of control charts.

The laboratory in-house limits are to be used for several purposes:

- Laboratories are expected to utilize their in-house limits as part of their quality control system, and to evaluate trends and monitor and improve performance.
- When laboratories' in-house limits are outside the DoD control limits (upper and/or lower), they must report their in-house limits in the laboratory report (see Appendix DoD-A) even if the LCS associated with the batch in fact fell within the DoD limits. In this manner, DoD will be able to evaluate how laboratory performance affects the quality of the environmental data.
- DoD may review the laboratory in-house limits and associated trends, as reflected in control charts, to determine whether the laboratory's overall performance is acceptable. If deemed unacceptable, this may be a basis on which DoD makes a decision to not use the laboratory again until substantial improvement has occurred.

TABLE D-4. LCS CONTROL LIMITS FOR VOLATILE ORGANIC COMPOUNDS SW-846 METHOD 8260 WATER MATRIX¹¹

Analyte	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit	Lower ME Limit	Upper ME Limit
1,1,1,2-Tetrachloroethane	105	8	80	130	75	135
1,1,1-Trichloroethane	100	11	65	130	55	145
1,1,2,2-Tetrachloroethane	96	11	65	130	55	140
1,1,2-Trichloroethane	100	8	75	125	65	135
1,1-Dichloroethane	101	11	70	135	60	145
1,1-Dichloroethene	99	10	70	130	55	140
1,1-Dichloropropene	102	10	75	130	65	140
1,2,3-Trichlorobenzene	99	14	55	140	45	155
1,2,3-Trichloropropane	98	9	75	125	65	130
1,2,4-Trichlorobenzene	100	11	65	135	55	145
1,2,4-Trimethylbenzene	103	10	75	130	65	140
1,2-Dibromo-3-chloropropane	91	14	50	130	35	145
1,2-Dibromoethane	100	7	80	120	75	125
1,2-Dichlorobenzene	96	9	70	120	60	130
1,2-Dichloroethane	100	10	70	130	60	140
1,2-Dichloropropane	100	8	75	125	65	135

¹¹ A number of sporadic marginal exceedances of the control limits are allowed, depending on the number of analytes spiked in the LCS. Refer to section D.2 and Table D-1 for guidance on the appropriate application of control and ME limits. LCS control limits are not available for Total Xylene. Xylene may be reported on a project-specific basis as a total number; however, for the purposes of the DoD QSM, it will be analyzed and reported as m,p-Xylene and o-Xylene. Additional limits for poor performing compounds can be found in section D.5 and for surrogate compounds in section D.6.

*See DOD Summary Attachment for DOD Specific Criteria

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TABLE D-4. LCS CONTROL LIMITS FOR VOLATILE ORGANIC COMPOUNDS SW-846
METHOD 8260 WATER MATRIX¹¹

Analyte	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit	Lower ME Limit	Upper ME Limit
1,3,5-Trimethylbenzene	102	10	75	130	65	140
1,3-Dichlorobenzene	100	8	75	125	65	130
1,3-Dichloropropane	100	9	75	125	65	135
1,4-Dichlorobenzene	99	8	75	125	65	130
2,2-Dichloropropane	103	11	70	135	60	150
2-Butanone	91	20	30	150	10	170
2-Chlorotoluene	100	9	75	125	65	135
2-Hexanone	92	12	65	130	45	140
4-Chlorotoluene	101	9	75	130	65	135
4-Methyl-2-pentanone	98	13	60	135	45	145
Acetone	91	17	40	140	20	160
Benzene	102	7	80	120	75	130
Bromobenzene	100	8	75	125	70	130
Bromochloromethane	97	11	65	130	55	140
Bromodichloromethane	98	8	75	120	70	130
Bromoform	99	10	70	130	60	140
Bromomethane	88	19	30	145	10	165
Carbon disulfide	100	21	35	160	15	185
Carbon tetrachloride	102	12	65	140	55	150
Chlorobenzene	102	7	80	120	75	130
Chlorodibromomethane	96	13	60	135	45	145
Chloroethane	99	12	60	135	50	145
Chloroform	100	12	65	135	50	150
Chloromethane	83	15	40	125	25	140
cis-1,2-Dichloroethene	99	9	70	125	60	135
cis-1,3-Dichloropropene	100	10	70	130	60	140
Dibromomethane	101	8	75	125	65	135
Dichlorodifluoromethane	93	21	30	165	10	175
Ethylbenzene	100	9	75	125	65	135
Hexachlorobutadiene	97	15	50	140	35	160
Isopropylbenzene	101	9	75	125	65	135
m,p-Xylene	102	9	75	130	65	135
Methyl tert-butyl ether	94	10	65	125	55	135
Methylene chloride	96	14	55	140	40	155
Naphthalene	96	14	55	140	40	150
n-Butylbenzene	103	11	70	135	55	150
n-Propylbenzene	101	9	70	130	65	140
o-Xylene	100	7	80	120	75	130
p-Isopropyltoluene	102	10	75	130	65	140
sec-Butylbenzene	100	9	70	125	65	135
Styrene	100	11	65	135	55	145
tert-Butylbenzene	99	10	70	130	60	140
Tetrachloroethene	96	18	45	150	25	165
Toluene	100	7	75	120	70	130
trans-1,2-Dichloroethene	99	13	60	140	45	150
trans-1,3-Dichloropropene	98	15	55	140	40	155
Trichloroethene	99	9	70	125	60	135
Trichlorofluoromethane	103	15	60	145	45	160
Vinyl chloride	99	16	50	145	35	165

*See DOD Summary Attachment for DOD Specific Criteria

TABLE D-5. LCS CONTROL LIMITS FOR VOLATILE ORGANIC COMPOUNDS SW-846
METHOD 8260 SOLID MATRIX¹²

Analyte	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit	Lower ME Limit	Upper ME Limit
1,1,1,2-Tetrachloroethane	100	9	75	125	65	135
1,1,1-Trichloroethane	101	11	70	135	55	145
1,1,2,2-Tetrachloroethane	93	13	55	130	40	145
1,1,2-Trichloroethane	95	11	60	125	50	140
1,1-Dichloroethane	99	9	75	125	65	135
1,1-Dichloroethene	100	12	65	135	55	150
1,1-Dichloropropane	102	11	70	135	60	145
1,2,3-Trichlorobenzene	97	12	60	135	50	145
1,2,3-Trichloropropane	97	11	65	130	50	140
1,2,4-Trichlorobenzene	98	11	65	130	55	140
1,2,4-Trimethylbenzene	100	12	85	135	55	145
1,2-Dibromo-3-chloropropane	87	16	40	135	25	150
1,2-Dibromoethane	97	9	70	125	60	135
1,2-Dichlorobenzene	97	7	75	120	65	125
1,2-Dichloroethane	104	11	70	135	60	145
1,2-Dichloropropane	95	8	70	120	65	125
1,3,5-Trimethylbenzene	99	11	65	135	55	145
1,3-Dichlorobenzene	98	9	70	125	65	135
1,3-Dichloropropane	100	8	75	125	70	130
1,4-Dichlorobenzene	98	8	70	125	65	135
2,2-Dichloropropane	101	11	65	135	55	145
2-Butanone	94	22	30	160	10	180
2-Chlorotoluene	98	10	70	130	60	140
2-Hexanone	97	16	45	145	30	160
4-Chlorotoluene	100	9	75	125	65	135
4-Methyl-2-pentanone	97	17	45	145	30	165
Acetone	88	23	20	160	10	180
Benzene	99	9	75	125	65	135
Bromobenzene ¹³	93	9	65	120	55	130
Bromochloromethane	99	9	70	125	60	135
Bromodichloromethane	100	9	70	130	60	135
Bromoform	96	13	55	135	45	150
Bromomethane	95	21	30	160	10	180
Carbon disulfide	103	19	45	160	30	180
Carbon tetrachloride	100	11	65	135	55	145
Chlorobenzene	99	8	75	125	65	130
Chlorodibromomethane	98	11	65	130	55	140
Chloroethane	98	20	40	155	20	175
Chloroform	98	9	70	125	65	135
Chloromethane	90	13	50	130	40	140

¹² A number of sporadic marginal exceedances of the control limits are allowed, depending on the number of analytes spiked in the LCS. Refer to section D.2 and Table D-1 for guidance on the appropriate application of control and ME limits. LCS control limits are not available for Methyl tert-butyl ether and Total Xylene although those compounds do appear on the target analyte list for method 8260 (Table C-1 in Appendix DoD-C). Sufficient data to perform statistically significant analyses were not received for MTBE during the LCS study. Xylene may be reported on a project-specific basis as a total number; however, for the purposes of the DoD QSM, it will be analyzed and reported as m,p-Xylene and o-Xylene. Additional limits for poor performing compounds can be found in section D.5 and for surrogate compounds in section D.6.

¹³ Provisional limits – outlier analyses during the LCS study resulted in LCS-CLs generated with data from fewer than four laboratories. Limits may be adjusted in the future as additional data become available.

**TABLE D-5. LCS CONTROL LIMITS FOR VOLATILE ORGANIC COMPOUNDS SW-846
METHOD 8260 SOLID MATRIX¹²**

Analyte	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit	Lower ME Limit	Upper ME Limit
cis-1,2-Dichloroethene	96	10	65	125	55	135
cis-1,3-Dichloropropene	99	9	70	125	65	135
Dibromomethane	100	9	75	130	65	135
Dichlorodifluoromethane ¹³	85	17	35	135	15	155
Ethylbenzene	101	9	75	125	65	135
Hexachlorobutadiene	98	15	55	140	40	155
Isopropylbenzene	103	9	75	130	70	140
m,p-Xylene	102	8	80	125	70	135
Methylene chloride	97	14	55	140	40	155
Naphthalene	84	14	40	125	25	140
n-Butylbenzene	101	12	65	140	50	150
n-Propylbenzene	99	12	65	135	50	145
o-Xylene	101	8	75	125	70	135
p-Isopropyltoluene	104	10	75	135	65	140
sec-Butylbenzene	97	11	65	130	50	145
Styrene	101	9	75	125	65	135
tert-Butylbenzene	99	11	65	130	55	145
Tetrachloroethene	103	12	65	140	55	150
Toluene	99	9	70	125	60	135
trans-1,2-Dichloroethene	100	11	65	135	55	145
trans-1,3-Dichloropropene	96	10	65	125	55	140
Trichloroethene	101	8	75	125	70	130
Trichlorofluoromethane	106	27	25	185	10	215
Vinyl chloride	92	11	60	125	45	140

**TABLE D-6. LCS CONTROL LIMITS FOR SEMIVOLATILE ORGANIC COMPOUNDS SW-846
METHOD 8270 WATER MATRIX¹⁴**

Analyte	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit	Lower ME Limit	Upper ME Limit
Polynuclear Aromatics						
2-Methylnaphthalene	75.0	9.5	45	105	35	115
Acenaphthene	77.6	10.1	45	110	35	120
Acenaphthylene	78.5	9.4	50	105	40	115
Anthracene	83.0	9.7	55	110	45	120
Benz[a]anthracene	82.7	8.9	55	110	45	120
Benzo[a]pyrene	81.3	9.5	55	110	45	120
Benzo[b]fluoranthene	81.8	12.1	45	120	35	130
Benzo[k]fluoranthene	84.6	13.2	45	125	30	135

¹⁴ A number of sporadic marginal exceedances of the control limits are allowed depending on the number of analytes spiked in the LCS. Refer to section D.2 and Table D-1 for guidance on the appropriate application of control and ME limits. LCS control limits are not available for Benzidine, 2,6-Dichlorophenol, and N-nitrosopyrrolidine, although those compounds do appear on the target analyte list for method 8270 (Table C-2 in Appendix DoD-C). Sufficient data to perform statistically significant analyses were not received for those analytes during the LCS study. Additional limits for poor performing compounds can be found in section D.5.

*See DOD Summary Attachment for DOD Specific Criteria

ARCADIS

Attachment C-2

System Startup Plan



**Northrop Grumman Systems
Corporation**

Attachment C-2

**System Startup Plan
Operable Unit 3
Soil Gas Interim Remedial Measure**

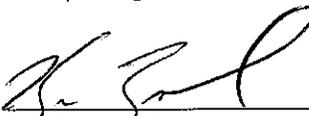
Former Grumman Settling Ponds,
Bethpage, New York
Site # 1-30-003A

February 8, 2008

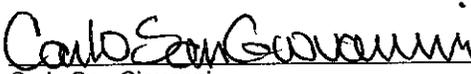
ARCADIS



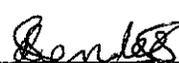
Christina Berardi Tuohy, P.E.
Principle Engineer



Ken Zegel, P.E.
Senior Engineer



Carlo San Giovanni
Project Director



Kyriacos Pierides, Ph.D., P.E.
License Number 073670, New York

**Attachment C-2
System Startup Plan
Operable Unit 3
Soil Gas Interim Remedial
Measure**

Former Grumman Settling Ponds
Bethpage, New York
Site # 1-30-003A

Prepared for:
Northrop Grumman Systems Corporation

Prepared by:
ARCADIS of New York, Inc.
Two Huntington Quadrangle
Suite 1S10
Melville
New York 11747
Tel 631.249.7600
Fax 631.249.7610

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Attachment C-1.3	System Startup General System Operating Parameter Form, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

1. Introduction

This Operable Unit 3 (OU3) Soil Gas Interim Remedial Measure (soil gas IRM) System Startup Plan (SSP) was prepared by ARCADIS of New York, Inc. (ARCADIS) on behalf of Northrop Grumman Systems Corporation (Northrop Grumman), and is being submitted pursuant to the Order On Consent (Consent Order or CO) Index # W1-0018-04-01 that was executed by the New York State Department of Environmental Conservation (NYSDEC) and Northrop Grumman, effective July 4, 2005 (NYSDEC 2005). The Park, which was termed the "Former Grumman Settling Ponds" and designated as Operable Unit 3 (OU3) by the NYSDEC, and the Former Grumman Plant 24 Access Road are collectively referred to in this Report as the Site.

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This SSP is being submitted as an Attachment to the Sampling and Analysis Plan (SAP) which will ultimately be a component of the Operation, Maintenance and Monitoring (OM&M) Manual. This SSP identifies the procedures to be used to ensure that the system operates in accordance with the design requirements and the procedures that will be used to demonstrate system performance during the initial operating period (e.g., during the system "startup" period). All procedures and protocols described herein shall be conducted in accordance with the requirements set forth in SAP, the Quality Assurance Project Plan (QAPP), provided as Attachments C-1.1 and C-1.2 of the SAP, and the site-specific Health and Safety Plan (HASP) (ARCADIS 2005), incorporated herein by reference.

System startup will consist of two phases: a system mechanical startup/shakedown period; and, a system startup performance monitoring period. It is anticipated that the mechanical startup/shakedown period will be completed over a one to two week duration. The system startup performance monitoring period will begin immediately following the mechanical startup period and will be completed during the first 28-days of full-time system operation. A description of the system startup methodology is provided below.

2. System Mechanical Startup and Shakedown

System mechanical startup/shakedown will be completed immediately following system construction but prior to full-time system operation. System mechanical startup/shakedown will be completed prior to system startup activities to the depressurization wells (e.g., the depressurization wells will not be connected to the regenerative blowers) and will include, but not be limited to the following:

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- Testing of all major mechanical equipment to ensure proper operation and motor rotation in accordance with the specifications and manufacturer's requirements.
- Testing of all electrical controls (i.e., level switches, transmitters, etc.) to ensure proper operation in accordance with the specifications and manufacturer's requirements.
- Final on-site troubleshooting and programming of the Main Control Panel (MCP); and,
- Operation of system in it's entirety to ensure proper operation.
- Programming and testing of the system autodialer.

The final connection to the depressurization well manifold will be made following completion of the mechanical startup/shakedown activities described above. The final phase of the mechanical startup/shakedown period will consist of a brief operating period with the depressurization wells connected to the system. All wells will be balanced for vacuum and flow in accordance with their initial design parameters provided in the 95% Design Report (ARCADIS 2007a). In addition, a final check will be made on the overall mechanical and electrical controls operation. Full time system operational startup will occur thereafter, as described below.

3. System Startup Activities

This section identifies the procedures to be used during the startup performance monitoring period of the Soil Gas IRM.

As referenced previously, the first 28 days of full-time system operation will be used for system startup performance monitoring. During this time period, system startup performance testing will be conducted at a greater frequency relative to the long-term OM&M requirements of the system. Testing will be used to confirm the proper operation of the system with respect to the performance objectives (e.g., the objectives described in the Soil Gas IRM Work Plan [ARCADIS 2007b]) and compliance requirements (e.g., air discharge limitations [NYSDEC 2003]). Startup performance testing will include the recording of system operating parameters and the collection of vapor and water samples for laboratory and/or field analysis. Table C-1.1 provides a summary of the proposed startup sampling schedule. Attachments C-1.1 through C-

1.3 provide the field logs that will be completed during system startup. A drawing showing the proposed sampling locations is provided in Drawing 3 of the 95% Design Report (ARCADIS 2007a). A summary of the proposed sampling schedule and methodology is provided below.

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Baseline Measurements --

System performance baseline measurements will be collected prior to full-time startup of the system. Specifically, baseline measurements will be collected from all induced vacuum monitoring well locations and from all groundwater and/or perched water monitoring wells as outlined on Attachment C-1.1. Ultimately, baseline induced vacuum measurements will be compared to the induced vacuum measurements taken following system startup to demonstrate that negative pressure is being maintained within the targeted capture zone.

Day 1 --

Day 1 is defined as the first 8-hours of system operation after the system flow and vacuum balancing is completed as described in Section 2.0 above. Day 1 startup performance monitoring will include the following:

- The collection of induced vacuum readings and depth to water measurements from all monitoring points at the beginning and end of the day (Attachment C-1.1).
- The collection of individual wellhead parameters from all monitoring points at the beginning and end of the day (Attachment C-1.2).
- The collection of system general operating parameters at the beginning and end of the day (Attachment C-1.3).
- The collection of vapor performance samples for field analysis using a photoionization detector (PID) from individual depressurization wells (i.e., vapor sample ports VSP-101 through VSP-118), from the individual blower effluent lines (VSP-201, 301, and 401), from the total effluent prior to treatment (i.e., VSP-601) and from the total effluent following treatment (i.e., VSP-602) at the beginning and the end of the day (Attachment C-1.3).

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Attachment C-2 System Startup Plan Operable Unit 3 Soil Gas Interim Remedial Measure

- The collection of vapor performance samples for laboratory analysis from individual depressurization wells (i.e., vapor sample ports VSP-101 through VSP-118) and from the total effluent prior to vapor treatment (i.e., VSP-601) at the end of the day.
- The collection of a vapor compliance sample for laboratory analysis from the total effluent following treatment (i.e., VSP-602) for laboratory analysis at the end of the day.

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Days 2, 7, 14, and 28 –

Days 2, 7, 14, and 28 startup performance monitoring will include the following:

- The collection of induced vacuum readings and depth to water measurements from all monitoring points (Attachment C-1.1).
- The collection of individual wellhead parameters from all monitoring points (Attachment C-1.2).
- The collection of system general operating parameters (Attachment C-1.3).
- The collection of vapor performance samples for field analysis using a photoionization detector (PID) from individual depressurization wells (i.e., vapor sample ports VSP-101 through VSP-118), from the total effluent prior to treatment (i.e., VSP-601) and from the total effluent following treatment (i.e., VSP-602)(Attachment C-1.3).
- The collection of a vapor performance sample for laboratory analysis from the total effluent prior to vapor treatment (i.e., VSP-601).
- The collection of a vapor compliance sample for laboratory analysis from the total effluent following treatment (i.e., VSP-602) for laboratory analysis.

In addition to the above, water quality samples will be collected and submitted for laboratory analysis from each of the individual knockout tanks (i.e., water sample ports WSP-210, 310, and 410) once during the 28 day startup period. Finally, a water quality sample will be collected and submitted for laboratory analysis from the water storage tank (WSP-501) once during the 28 day startup period. The analytical results from sample location WSP-501 will be reviewed and compared to the anticipated water

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Attachment C-2 System Startup Plan Operable Unit 3 Soil Gas Interim Remedial Measure

quality as described in Northrop Grumman's letter to the Nassau County Department of Public Works (Northrop Grumman 2007) prior to discharge to the publicly owned treatment work (POTW).

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All samples collected for laboratory analysis will be collected and submitted in accordance with the methodology and analytical methods provided in the SAP. All performance samples will be analyzed using standard laboratory turnaround times (TATs). Expedited TATs will be used for compliance sampling until a trend is established and/or breakthrough is expected.

4. Quality Assurance Procedures

All startup performance sampling will be conducted in accordance with the quality assurance procedures outlined in the QAPP provided as Attachments C-1.1 and C-1.2 of the SAP.

5. Reporting

A complete summary of the system startup field parameter and analytical results will be provided in the first monthly interim progress report as described in the SAP. Draft interim startup results will be provided to the NYSDEC in the form of electronic mail submittals during the 28 day startup period.

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Attachment C-2 System Startup Plan Operable Unit 3 Soil Gas Interim Remedial Measure

6. References

ARCADIS of New York, Inc. 2007a. 95% Design Report Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York, Site #1-30-003A September 7, 2007

ARCADIS of New York, Inc. 2007b. Operable Unit 3 – Soil Gas Interim Remedial Measure Work Plan, Former Grumman Settling Ponds, Bethpage, New York, Site #1-30-003A February 16, 2007.

New York State Department of Environmental Conservation (NYSDEC), 2005, Order on Consent Index #WI-0018-04-01, Site # 1-30-003A, July 4, 2005.

New York State Department of Environmental Conservation, Division of Air Resources-1 (DAR-1) Guidelines for the Control of Toxic Ambient Air Contaminants dated 1991 and the AGC/SGC Tables dated December 22, 2003.

Northrop Grumman Systems Corporation, September 6, 2007. Request for Discharge of IRM Condensate Water to Nassau County POTW, Northrop Grumman Systems Corporation, Bethpage, New York.

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Table C-1.1. Summary of System Startup Performance Monitoring and Testing Schedule, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Sample Location/Description	Parameter/Measurement	Frequency
<u>Parameters for Field Analysis</u>¹		
<u>Field Parameters</u>		
Induced Vacuum and Water Level Readings	All Parameters Listed on Attachment C-1.1	Beginning and End of Day 1 Once During Days 2, 7, 14, and 28
Individual Wellhead Operating Parameters	All Parameters Listed on Attachment C-1.2	Beginning and End of Day 1 Once During Days 2, 7, 14, and 28
General System Operating Parameters	All Parameters Listed on Attachment C-1.3	Beginning and End of Day 1 Once During Days 2, 7, 14, and 28
<u>Vapor Samples</u>		
<u>Individual Depressurization Wells</u>		
VSP-101 Through VSP-118	Photoionization Detector	End of Day 1 Once During Days 2, 7, 14, and 28
<u>Total Effluent Prior to Treatment</u>		
VSP-601	Photoionization Detector	End of Day 1 Once During Days 2, 7, 14, and 28
<u>Total Effluent Following Treatment</u>		
VSP-602	Photoionization Detector	End of Day 1 Once During Days 2, 7, 14, and 28
<u>Samples for Laboratory Analysis</u>		
<u>Vapor Samples</u>		
<u>Individual Depressurization Wells</u>		
VSP-101 Through VSP-118	VOCs (USEPA Method TO-15+) ²	End of Day 1
<u>Total Effluent Prior to Treatment</u>		
VSP-601	VOCs (USEPA Method TO-15+) ²	End of Day 1 Once During Days 2, 7, 14, and 28
<u>Total Effluent Following Treatment</u>		
VSP-602	VOCs (USEPA Method TO-15+) ²	End of Day 1 Once During Days 2, 7, 14, and 28

continued on following page.

Table C-1.1. Summary of System Startup Performance Monitoring and Testing Schedule, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Sample Location/Description	Parameter/Measurement	Frequency
<u>Water Samples</u>		
<u>Knock Out Tanks Effluent</u>		
WSP-210	VOCs (USEPA Method 8260)	Once During 28 Day Startup ³
WSP-310	VOCs (USEPA Method 8260)	Once During 28 Day Startup ³
WSP-410	VOCs (USEPA Method 8260)	Once During 28 Day Startup ³
<u>Water Storage Tank Effluent</u>		
WSP-501	VOCs (USEPA Method 8260)	Once During 28 Day Startup ⁴

Notes:

1. All parameters for field analysis will be recorded using dedicated system mechanical gauges, handheld portable field gauges, and a portable photoionization detector (PID). All portable field equipment shall be calibrated prior to use.
2. All vapor samples to submitted for laboratory analysis using USEPA Method TO-15 (modified list plus the top 15 tentatively identified compounds (TICs) including the TIC Freon. Complete analyte list is provided in Table C-2 of the Sampling and Analysis Plan (SAP).
3. Knockout tank water samples will be collected upon collection of sufficient water to collect a sample.
4. Water storage tank sample will be collected prior to transfer to existing publicly owned treatment works (POTW).

Attachment C-1.1.

System Startup Induced Vacuum Monitoring Form, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Vapor Monitoring Point				DW-1S ⁽¹⁾	VMWC-1A	VMWC-1B	VMWC-1C	VMWC-2A	VMWC-2C	VMWC-3A	VMWC-3B
Screened Interval (ft bls)				15 to 30	7.5 to 8.5	12 to 13	24.7 to 39.7	9 to 10	21 to 22	7.5 to 8.5	13 to 14
Associated Depressurization Well				--	DW-1S	DW-1S	DW-1S	DW-1S	DW-1S	DW-1S	DW-1S
Distance From Depressurization Well to Monitoring Point (ft)				NA	10	10	10	25	25	55	55
Day	Recorder Initials	Date	Time	Induced Vacuum Measurement (iwc)							
Baseline											
Day 1											
1st Round											
2nd Round											
Day 2											
Day 7											
Day 14											
Day 28											

Notes and abbreviations on last page.

	Barometric Pressure (in Hg)	Ambient Temperature (F)	Ambient Conditions		Barometric Pressure (in Hg)	Ambient Temperature (F)	Ambient Conditions
Day 1 - AM				Day 7			
Day 1 - PM				Day 14			
Day 2				Day 28			

Attachment C-1.1.

System Startup Induced Vacuum Monitoring Form, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bathpage, New York.

Vapor Monitoring Point				VMWC-3C	VMWC-4A	VMWC-4B	VMWC-4C	DW-1D ⁽¹⁾	VMWC-1D ⁽²⁾	VMWC-2D	VMWC-3D
Screened Interval (ft bls)				22 to 23	6 to 7	12 to 13	21 to 22	42 to 47	44 to 54	44 to 45	45 to 46
Associated Depressurization Well				DW-1S	DW-1S	DW-1S	DW-1S	--	DW-1D	DW-1D	DW-1D
Distance From Depressurization Well to Monitoring Point (ft)				55	35	35	35	NA	13	28	58
Day	Recorder Initials	Date	Time	Induced Vacuum Measurement (iwc)							
Baseline											
Day 1											
1st Round											
2nd Round											
Day 2											
Day 7											
Day 14											
Day 28											

Notes and abbreviations on last page.

	Barometric Pressure (in Hg)	Ambient Temperature (F)	Ambient Conditions		Barometric Pressure (in Hg)	Ambient Temperature (F)	Ambient Conditions
Day 1 - AM				Day 7			
Day 1 - PM				Day 14			
Day 2				Day 28			

Attachment C-1.1.

System Startup Induced Vacuum Monitoring Form, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Vapor Monitoring Point				VMWC-4D	DW-2S ⁽¹⁾	VMWC-5A	VMWC-5B	VMWC-6A	VMWC-6B	VMWC-7A	VMWC-7B
Screened Interval (ft bls)				44 to 45	10 to 17	7 to 8	15.2 to 19.2	8 to 9	15 to 16	7 to 8	14 to 15
Associated Depressurization Well				DW-1D	--	DW-2S	DW-2S	DW-2S	DW-2S	DW-2S	DW-2S
Distance From Depressurization Well to Monitoring Point (ft)				35	NA	10	10	25	25	50	50
Day	Recorder Initials	Date	Time	Induced Vacuum Measurement (iwc)							
Baseline											
Day 1											
1st Round											
2nd Round											
Day 2											
Day 7											
Day 14											
Day 28											

Notes and abbreviations on last page.

Attachment C-1.1.

System Startup Induced Vacuum Monitoring Form, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure,
Former Grumman Settling Ponds, Bethpage, New York.

Vapor Monitoring Point				VMWC-8A	VMWC-8B	DW-2D ⁽¹⁾	VMWC-5D ⁽²⁾	VMWC-6D	VMWC-7D	VMWC-8D	VMWC-13D
Screened Interval (ft bls)				7 to 8	13 to 14	27 to 47	40 to 50	39 to 40	36 to 37	35 to 36	27 to 47
Associated Depressurization Well				DW-2S	DW-2S	–	DW-2D	DW-2D	DW-2D	DW-2D	DW-2D
Distance From Depressurization Well to Monitoring Point (ft)				35	35	NA	13	28	53	35	230
Day	Recorder Initials	Date	Time	Induced Vacuum Measurement (iwc)							
Baseline											
Day 1											
1st Round											
2nd Round											
Day 2											
Day 7											
Day 14											
Day 28											

Notes and abbreviations on last page.

Attachment C-1.1.

System Startup Induced Vacuum Monitoring Form, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Vapor Monitoring Point				VMWC-17D	DW-3S ⁽¹⁾	VMWC-9A	VMWC-9B	VMWC-10B	VMWC-11B	DW-3D ⁽¹⁾	VMWC-10D
Screened Interval (ft bls)				32 to 47	10 to 30	6.3 to 7.3	19.3 to 20.3	18.8 to 19.8	19.2 to 20.2	26 to 46	39 to 40
Associated Depressurization Well				DW-2D	--	DW-3S	DW-3S	DW-3S	DW-3S	--	DW-3D
Distance From Depressurization Well to Monitoring Point (ft)				188	NA	30.2	34	55.3	80.8	NA	53
Day	Recorder Initials	Date	Time	Induced Vacuum Measurement (iwc)							
Baseline											
Day 1											
1st Round											
2nd Round											
Day 2											
Day 7											
Day 14											
Day 28											

Notes and abbreviations on last page.

Attachment C-1.1.

System Startup Induced Vacuum Monitoring Form, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Vapor Monitoring Point				VMWC-11D	VMWC-12D	DW-4S ⁽¹⁾	VMWC-16A	VMWC-16B	DW-4D ⁽¹⁾	VMWC-16D	DW-5S ⁽¹⁾
Screened Interval (ft bis)				39.3 to 40.3	39.2 to 40.2	15 to 30	7 to 8	13 to 14	27 to 47	45 to 46	15 to 30
Associated Depressurization Well				DW-3D	DW-3D	--	DW-4S	DW-4S	--	DW-4D	--
Distance From Depressurization Wall to Monitoring Point (ft)				79	102	NA	85	88	NA	86	NA
Day	Recorder Initials	Date	Time	Induced Vacuum Measurement (iwc)							
Baseline											
Day 1											
1st Round											
2nd Round											
Day 2											
Day 7											
Day 14											
Day 28											

Notes and abbreviations on last page.

Attachment C-1.1.

System Startup Induced Vacuum Monitoring Form, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure,
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Vapor Monitoring Point				VMWC-15A	VMWC-15B	DW-5D ⁽¹⁾	VMWC-15D	DW-6S ⁽¹⁾	DW-6D ⁽¹⁾	DW-7S ⁽¹⁾	VMWC-14A
Screened Interval (ft bls)				7 to 8	13 to 14	42 to 47	45 to 46	15 to 30	42 to 47	10 to 30	6 to 7
Associated Depressurization Well				DW-5S	DW-6S		DW-5D				DW-7S
Distance From Depressurization Well to Monitoring Point (ft)				69	72	NA	73	NA	NA	NA	49
Day	Recorder Initials	Date	Time	Induced Vacuum Measurement (iwc)							
Baseline											
Day 1											
1st Round											
2nd Round											
Day 2											
Day 7											
Day 14											
Day 28											

Notes and abbreviations on last page.

Attachment C-1.1.

System Startup Induced Vacuum Monitoring Form, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Vapor Monitoring Point				VMWC-14B	DW-7D ⁽¹⁾	VMWC-14D	DW-8S ⁽¹⁾	DW-9S ⁽¹⁾	DW-10S ⁽¹⁾	DW-11S ⁽¹⁾	VMWC-18A
Screened Interval (ft bis)				18 to 19	30 to 40	38 to 39	10 to 17	10 to 17	10 to 17	10 to 17	7 to 8
Associated Depressurization Well				DW-7S	--	DW-7D	--	--	--	--	DW-11S
Distance From Depressurization Well to Monitoring Point (ft)				52	NA	61	NA	NA	NA	NA	41
Day	Recorder Initials	Date	Time	Induced Vacuum Measurement (iwc)							
Baseline											
Day 1											
1st Round											
2nd Round											
Day 2											
Day 7											
Day 14											
Day 28											

Notes and abbreviations on last page.

Attachment C-1.1.

System Startup Induced Vacuum Monitoring Form, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Vapor Monitoring Point				VMWC-18B	VMWC-1D	VMWC-5D	B24MW-3
Screened Interval (ft bls)				13 to 14	44 to 54	40 to 50	55 to 70
Associated Depressurization Well				DW-11S	DW-1D	DW-2D	DW-5D
Distance From Depressurization Well to Monitoring Point (ft)				42	13	13	33
Day	Recorder Initials	Date	Time	Induced Vacuum Measurement (iwc)	Water Level Elevation (ft bmp)		
Baseline							
Day 1							
1st Round							
2nd Round							
Day 2							
Day 7							
Day 14							
Day 28							

Notes and abbreviations on last page.

Attachment C-1.1.

System Startup Induced Vacuum Monitoring Form, Northrop Grumman Operable
Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Notes and Abbreviations:

1. Vapor monitoring points in **BOLD** text are depressurization wells.
 2. Water Level to be collected for this location and recorded on last page.
 3. + indicates increasing, - indicates decreasing
- distance and well screen depth are based on field measurements and locations not surveyed.
- the specified well is a depressurization well
- F** degrees Fahrenheit
- ft** feet
- ft bls** feet below land surface
- ft bmp** feet below measuring point
- in Hg** inches of mercury
- iwc** inches of water column
- NA** not applicable

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-1S					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-114	--	VI-132	--	VSP-114	VI-114
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	150 scfm	--	65	--	-3.9
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- ██████████ Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-1D						
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum	
Instrument ID				FI-105	--	VI-123	--	VSP-105	VI-105	
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)	
Design Value				--	75 scfm	--	65	--	-33.5	
Day	Recorder Initials	Date	Time							
Baseline										
Day 1										
First Round										
Second Round										
Day 2										
Day 7										
Day 14										
Day 28										

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-2S					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-110	--	VI-128	--	VSP-110	VI-110
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	66 scfm	--	65	--	-3.8
Day		Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- ██████████ Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bathpage, New York.

Depressurization Well				DW-2D					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-107	--	VI-125	--	VSP-107	VI-107
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	100 scfm	--	65	--	-5.0
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- ██████████ Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-3S					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-117	--	VI-135	--	VPS-117	VI-117
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	79 scfm	--	65	--	-1.6
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-3D					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-102	--	VI-120	--	VSP-102	VI-102
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	102 scfm	--	65	--	-2.6
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- ██████████ Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-4S					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-113	--	VI-131	--	VSP-113	VI-113
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	150 scfm	--	65	--	-3.9
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
First Round									
Second Round									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- Parameter will not be recorded.

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Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-4D					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-106	--	VI-124	--	VSP-106	VI-106
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	75 scfm	--	65	--	-33.5
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- ██████████ Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-5S					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-116	--	VI-134	--	VSP-116	VI-116
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	150 scfm	--	65	--	-3.9
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
First Round									
Second Round									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-5D					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-103	--	VI-121	--	VSP-103	VI-103
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	75 scfm	--	65	--	-33.5
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Farenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- ██████████ Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-6S					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-115	--	VI-133	--	VSP-115	VI-115
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	150 scfm	--	65	--	-3.9
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- ██████████ Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-6D					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-104	--	VI-122	--	VSP-104	VI-104
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	75 scfm	--	65	--	-33.5
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- ██████████ Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-7S					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-118	--	VI-136	--	VSP-118	VI-118
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	45 scfm	--	65	--	-0.8
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- ██████████ Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-7D					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-101	--	VI-119	--	VSP-101	VI-101
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	49 scfm	--	65	--	-1.4
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-8S					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-112	--	VI-130	--	VSP-112	VI-112
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	66 scfm	--	65	--	-3.8
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
First Round									
Second Round									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- [Redacted] Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-9S					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-111	--	VI-129	--	VSP-111	VI-111
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	66 scfm	--	65	--	-3.8
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
First Round									
Second Round									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- ██████████ Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-10S					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-109	--	VI-127	--	VSP-109	VI-109
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	66 scfm	--	65	--	-3.8
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- ██████████ Parameter will not be recorded.

Attachment C-1.2. System Startup Wellhead Vacuum and Flow Monitoring Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well				DW-11S					
Parameter				Differential Pressure ⁽¹⁾	Equivalent Flow Rate	Vacuum at Mainfold ⁽¹⁾	Temperature	PID	Wellhead Vacuum
Instrument ID				FI-108	--	VI-126	--	VSP-108	VI-108
Units				(iwc)	(scfm)	(iwc)	(F)	(ppmv)	(iwc)
Design Value				--	66 scfm	--	65	--	-3.8
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
<i>First Round</i>									
<i>Second Round</i>									
Day 2									
Day 7									
Day 14									
Day 28									

Notes:

- 1. Line vacuum and flow rate measurements are to be collected inside the treatment building.
 - not applicable
 - F degrees Fahrenheit
 - FI flow rate indicator
 - iwc inches of water column
 - ppmv parts per million by volume
 - scfm standard cubic feet per minute
 - VI vacuum indicator
 - VSP vapor sample point
- ██████████ Parameter will not be recorded.

Attachment C-1.3. System Startup General System Operating Parameter Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Parameter				Knock Out Tanks Influent Vacuum			Knock Out Tanks Totalizer		
Instrument ID				VI-201	VI-301	VI-401	FQI-210	FQI-310	FQI-410
Location				KO-200 Influent	KO-300 Influent	KO-400 Influent	KO-200 Effluent	KO-300 Effluent	KO-400 Effluent
Units				(iwc)			(gallons)		
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
Day 2									
Day 7									
Day 14									
Day 28									

Notes and Abbreviations:

- The blower effluent and total effluent air flow rates are to be measured using a hand-held anemometer.

Parameter will not be recorded.

BL blower
 F degrees Fahrenheit
 FE flow monitoring element access point
 FQI flow totalizer indicator
 iwc inches of water column
 KO knock out tank
 PI pressure indicator
 PID photo-ionization detector

PIT pressure indicating transmitter
 ppmv parts per million by volume
 scfm standard cubic feet per minute
 TI temperature indicator
 TT temperature transmitter
 VI vacuum indicator
 VIT vacuum indicating transmitter
 VPGAC vapor phase granular activated carbon
 VSP vapor sample port

Attachment C-1.3. System Startup General System Operating Parameter Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bathpage, New York.

Parameter				Blowers Influent Vacuum			Blowers Effluent Pressure		
Instrument ID				VIT-202	VIT-302	VIT-402	PI-201	PI-301	PI-401
Location				BL-200 Influent	BL-300 Influent	BL-400 Influent	BL-200 Effluent	BL-300 Effluent	BL-400 Effluent
Units				(iwc)			(iwc)		
Day	Recorder Initials	Data	Time						
Baseline									
Day 1									
Day 2									
Day 7									
Day 14									
Day 28									

Notes and Abbreviations:

- The blower effluent and total effluent air flow rates are to be measured using a hand-held anemometer.

Parameter will not be recorded.

- BL blower
- F degrees Fahrenheit
- FE flow monitoring element access point
- FQI flow totalizer indicator
- iwc inches of water column
- KO knock out tank
- PI pressure indicator
- PID photo-ionization detector

- PIT pressure indicating transmitter
- ppmv parts per million by volume
- scfm standard cubic feet per minute
- TI temperature indicator
- TT temperature transmitter
- VI vacuum indicator
- VIT vacuum indicating transmitter
- VPGAC vapor phase granular activated carbon
- VSP vapor sample port

Attachment C-1.3. System Startup General System Operating Parameter Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Parameter				Blowers Effluent Air Flow			Blowers Effluent PID		
Instrument ID				FE ⁽¹⁾			VSP-201	VSP-301	VSP-401
Location				BL-200 Effluent	BL-300 Effluent	BL-400 Effluent	BL-200 Effluent	BL-300 Effluent	BL-400 Effluent
Units				(scfm)			(ppmv)		
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
Day 2									
Day 7									
Day 14									
Day 28									

Notes and Abbreviations:

- The blower effluent and total effluent air flow rates are to be measured using a hand-held anemometer.

 Parameter will not be recorded.

- BL blower
- F degrees Fahrenheit
- FE flow monitoring element access point
- FQI flow totalizer indicator
- iwc inches of water column
- KO knock out tank
- PI pressure indicator
- PID photo-ionization detector

- PIT pressure indicating transmitter
- ppmv parts per million by volume
- scfm standard cubic feet per minute
- TI temperature indicator
- TT temperature transmitter
- VI vacuum indicator
- VIT vacuum indicating transmitter
- VPGAC vapor phase granular activated carbon
- VSP vapor sample port

Attachment C-1.3. System Startup General System Operating Parameter Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Parameter				Total Effluent Flow Rate	Total Effluent PID	Heat Exchanger Influent Temperature	Total Effluent Pressure	VPGAC Influent Temperature	VPGAC Effluent PID
Instrument ID				FE ⁽¹⁾	VSP-601	TI-601	PIT-601	TI-602/TT-602	VSP-602
Location				Combined Effluent	Combined Effluent	Combined Effluent	Combined Effluent	Combined Effluent	Combined Effluent
Units				(scfm)	(ppmv)	(F)	(iwc)	(F)	(ppmv)
Day	Recorder Initials	Date	Time						
Baseline									
Day 1									
Day 2									
Day 7									
Day 14									
Day 28									

Notes and Abbreviations:

- The blower effluent and total effluent air flow rates are to be measured using a hand-held anemometer.

Parameter will not be recorded.

- BL blower
- F degrees Fahrenheit
- FE flow monitoring element access point
- FQI flow totalizer indicator
- iwc inches of water column
- KO knock out tank
- PI pressure indicator
- PID photo-ionization detector

- PIT pressure indicating transmitter
- ppmv parts per million by volume
- scfm standard cubic feet per minute
- TI temperature indicator
- TT temperature transmitter
- VI vacuum indicator
- VIT vacuum indicating transmitter
- VPGAC vapor phase granular activated carbon
- VSP vapor sample port

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Attachment C-3

System Long – Term Monitoring
and Parameter Forms

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Attachment C-3.1. System Long-Term Induced Vacuum Monitoring Form, Operable Unit 3, Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well	Vapor Monitoring Point	Screened Interval (ft bls)	Distance ⁽¹⁾ (feet)	Induced Vacuum Reading (inches of water)
DW-1S		15 to 30	NA	
	VMWC-1A	7.5 to 8.5	10	
	VMWC-1B	12 to 13	10	
	VMWC-1C	24.7 to 39.7	10	
	VMWC-2A	9 to 10	25	
	VMWC-2C	21 to 22	25	
	VMWC-3A	7.5 to 8.5	55	
	VMWC-3B	13 to 14	55	
	VMWC-3C	22 to 23	55	
	VMWC-4A	6 to 7	35	
	VMWC-4B	12 to 13	35	
VMWC-4C	21 to 22	35		
DW-1D		42 to 47	NA	
	VMWC-1D ⁽³⁾	44 to 54	13	
	VMWC-2D	44 to 45	28	
	VMWC-3D	45 to 46	58	
	VMWC-4D	44 to 45	35	
DW-2S		10 to 17	NA	
	VMWC-5A	7 to 8	10	
	VMWC-5B	15.2 to 19.2	10	

Initials:		Date:	(+/-) ⁽²⁾
Barometric Pressure (inHg)			
Ambient Temperature (Fahrenheit)			
Ambient Conditions			

Notes:

1. Distance is relative to associated depressurization well.
2. + indicates increasing, - indicates decreasing
3. Depth to water readings to be collected at this location record on last page.

Abbreviations:

---- reading recorded elsewhere on form ft bls - feet below land surface in Hg - inches of Mercury
 DW - depressurization well ft bmp - feet below measuring point VMWC- vapor monitoring well cluster

-----distances and well screen intervals not confirmed- based on field measurements.

Attachment C-3.1. System Long-Term Induced Vacuum Monitoring Form, Operable Unit 3, Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well	Vapor Monitoring Point	Screened Interval (ft bls)	Distance ⁽¹⁾ (feet)	Induced Vacuum Reading (inches of water)
DW-2S (continued)		10 to 17	NA	----
	VMWC-6A	8 to 9	25	
	VMWC-6B	15 to 16	25	
	VMWC-7A	7 to 8	50	
	VMWC-7B	14 to 15	50	
	VMWC-8A	7 to 8	35	
	VMWC-8B	13 to 14	35	
DW-2D		27 to 47	NA	
	VMWC-5D ⁽³⁾	40 to 50	13	
	VMWC-6D	39 to 40	28	
	VMWC-7D	36 to 37	53	
	VMWC-8D	35 to 36	35	
	VMWC-13D	27 to 47	230	
	VMWC-17D	32 to 47	188	
DW-3S		10 to 30	NA	
	VMWC-9A	6.3 to 7.3	30.2	
	VMWC-9B	19.3 to 20.3	34	
	VMWC-10B	18.8 to 19.8	55.3	
	VMWC-11B	19.2 to 20.2	80.8	

Initials:		Date:	(+/-) ⁽²⁾
Barometric Pressure (inHg)			
Ambient Temperature (Fahrenheit)			
Ambient Conditions			

Notes:

- Distance is relative to associated depressurization well.
- + indicates increasing, - indicates decreasing
- Depth to water readings to be collected at this location record on last page.

Abbreviations:

---- reading recorded elsewhere on form ft bls - feet below land surface in Hg - inches of Mercury
 DW - depressurization well ft bmp - feet below measuring point VMWC- vapor monitoring well cluster
 -distances and well screen intervals not confirmed- based on field measurements.

Attachment C-3.1. System Long-Term Induced Vacuum Monitoring Form, Operable Unit 3, Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well	Vapor Monitoring Point	Screened Interval (ft bls)	Distance ⁽¹⁾ (feet)	Induced Vacuum Reading (inches of water)
DW-3D		26 to 46	NA	
	VMWC-10D	39 to 40	53	
	VMWC-11D	39.3 to 40.3	79	
	VMWC-12D	39.2 to 40.2	102	
DW-4S		15 to 30	NA	
	VMWC-16A	7 to 8	85	
	VMWC-16B	13 to 14	88	
DW-4D		27 to 47	NA	
	VMWC-16D	45 to 46	86	
DW-5S		15 to 30	NA	
	VMWC-15A	7 to 8	69	
	VMWC-15B	13 to 14	72	
DW-5D		42 to 47	NA	
	VMWC-15D	45 to 46	73	
DW-6S		15 to 30	NA	
DW-6D		42 to 47	NA	

Initials:		Date:	(+/-) ⁽²⁾
Barometric Pressure (inHg)			
Ambient Temperature (Fahrenheit)			
Ambient Conditions			

Notes:

1. Distance is relative to associated depressurization well.
2. + indicates increasing, - indicates decreasing
3. Depth to water readings to be collected at this location record on last page.

Abbreviations:

--- reading recorded elsewhere on form ft bls - feet below land surface in Hg - inches of Mercury
 DW - depressurization well ft bmp - feet below measuring point VMWC- vapor monitoring well cluster
 -distances and well screen intervals not confirmed- based on field measurements.

Attachment C-3.1. System Long-Term Induced Vacuum Monitoring Form, Operable Unit 3, Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Depressurization Well	Vapor Monitoring Point	Screened Interval (ft bls)	Distance ⁽¹⁾ (feet)	Induced Vacuum Reading (inches of water)
DW-7S		10 to 30	NA	
	VMWC-14A	6 to 7	49	
	VMWC-14B	18 to 19	52	
DW-7D		30 to 40	NA	
	VMWC-14D	38 to 39	61	
DW-8S		10 to 17	NA	
	VMWC-16A	See DW-4S	57	----
	VMWC-16B	See DW-4S	54	----
DW-9S		10 to 17	NA	
DW-10S		10 to 17	NA	
	VMWC-7A	See DW-2S	65	----
	VMWC-7B	See DW-2S	65	----
DW-11S		10 to 17	NA	
	VMWC-18A	7 to 8	41	
	VMWC-18B	13 to 14	42	

Location ID	Vapor Monitoring Point	Screened Interval (ft bls)	Distance ⁽¹⁾ (feet)	Depth to Water (ft bmp)
VMWC-1D	DW-1D	44 to 54	13	
VMWC-5D	DW-2D	40 to 50	13	
B24MW-3	DW-5D	55 to 70	33	

Initials:		Date:	(+/-) ⁽²⁾
Barometric Pressure (inHg)			
Ambient Temperature (Fahrenheit)			
Ambient Conditions			

Notes:

1. Distance is relative to associated depressurization well.
2. + indicates increasing, - indicates decreasing
3. Depth to water readings to be collected at this location record on last page.

Abbreviations:

---- reading recorded elsewhere on form ft bls - feet below land surface in Hg - inches of Mercury
 DW - depressurization well ft bmp - feet below measuring point VMWC- vapor monitoring well cluster
 -----distances and well screen intervals not confirmed- based on field measurements.

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Attachment C-3.2. System Long-Term Individual Wellhead Monitoring Form, Operable Unit 3, Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Well ID	Well Head Readings			Manifold Readings										
	Vacuum Indicator ID	Vacuum (iwc)	Normal Operating ⁽²⁾ Vacuum (iwc)	Flow Indicator ID	Unit Size (inch)	Differential Pressure (iwc)	Equivalent Flow Rate (scfm)	Normal Operating ⁽²⁾ Flow Rate (scfm)	Vacuum Indicator ID	Vacuum (iwc)	Normal Operating ⁽²⁾ Vacuum (iwc)	Temperature (FE) (F)	Sample Port ID	VOC's (FE) (ppmv)
DW-7D	VI-101			FI-101					VI-119				VSP-101	
DW-3D	VI-102			FI-102					VI-120				VSP-102	
DW-5D	VI-103			FI-103					VI-121				VSP-103	
DW-6D	VI-104			FI-104					VI-122				VSP-104	
DW-1D	VI-105			FI-105					VI-123				VSP-105	
DW-4D	VI-106			FI-106					VI-124				VSP-106	
DW-2D	VI-107			FI-107					VI-125				VSP-107	
DW-11S	VI-108			FI-108					VI-126				VSP-108	
DW-10S	VI-109			FI-109					VI-127				VSP-109	

Initials:		Date:	(+/-) ⁽¹⁾
Barometric Pressure (inHg)			
Ambient Temperature (F)			
Ambient Conditions			

Abbreviations:

DW	depressurization well	iwc	inches of water column
FE	flow element access point	PID	photoionization detector
F	Fahrenheit	ppm	parts per million by volume
FI	flow indicator	scfm	standard cubic feet per minute
in Hg	inches of mercury	VI	vacuum indicator
		VOC's	volatile organic compounds

Notes:

- + indicates increasing, - indicates decreasing
- Normal Operating conditions to be defined during system start-up.

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Attachment C-3.2. System Long-Term Individual Wellhead Monitoring Form, Operable Unit 3, Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Well ID	Well Head Readings			Manifold Readings										
	Vacuum Indicator ID	Vacuum (iwc)	Normal Operating ⁽²⁾ Vacuum (iwc)	Flow Indicator ID	Unit Size (inch)	Differential Pressure (iwc)	Equivalent Flow Rate (scfm)	Normal Operating ⁽²⁾ Flow Rate (scfm)	Vacuum Indicator ID	Vacuum (iwc)	Normal Operating ⁽²⁾ Vacuum (iwc)	Temperature (FE) (F)	Sample Port ID	VOC's (FE) (ppmv)
DW-2S	VI-110			FI-110					VI-128				VSP-110	
DW-9S	VI-111			FI-111					VI-129				VSP-111	
DW-8S	VI-112			FI-112					VI-130				VSP-112	
DW-4S	VI-113			FI-113					VI-131				VSP-113	
DW-1S	VI-114			FI-114					VI-132				VSP-114	
DW-6S	VI-115			FI-115					VI-133				VSP-115	
DW-5S	VI-116			FI-116					VI-134				VSP-116	
DW-3S	VI-117			FI-117					VI-135				VSP-117	
DW-7S	VI-118			FI-118					VI-136				VSP-118	

Initials:		Date:	(+/-) ⁽¹⁾
Barometric Pressure (InHg)			
Ambient Temperature (F)			
Ambient Conditions			

Abbreviations:

DW	depressurization well	iwc	inches of water column
FE	flow element access point	PID	photoionization detector
F	Fahrenheit	ppmv	parts per million by volume
FI	flow indicator	scfm	standard cubic feet per minute
in Hg	inches of mercury	VI	vacuum indicator
		VOC's	volatile organic compounds

Notes:

- + indicates increasing, - indicates decreasing
- Normal Operating conditions to be defined during system start-up.

Attachment C-3.3. System Long-Term General System Operating Parameter Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Parameter		Knock Out Tanks Influent Vacuum			Knock Out Tanks Totalizer		
Instrument ID		VI-201	VI-301	VI-401	FQI-210	FQI-310	FQI-410
Location		KO-200 Influent	KO-300 Influent	KO-400 Influent	KO-200 Effluent	KO-300 Effluent	KO-400 Effluent
Units		(iwc)			(gallons)		
Recorder Initials	Date / Time						

Parameter		Blowers Influent Vacuum			Blowers Effluent Pressure		
Instrument ID		VIT-202	VIT-302	VIT-402	PI-201	PI-301	PI-401
Location		BL-200 Influent	BL-300 Influent	BL-400 Influent	BL-200 Effluent	BL-300 Effluent	BL-400 Effluent
Units		(iwc)			(iwc)		

Note:

- The blower and total effluent air flow rates are to be measured using a hand-held anemometer.

Abbreviations:

BL	blower	PIT	pressure indicating transmitter
F	degrees Fahrenheit	ppmv	parts per million by volume
FE	flow monitoring element access point	scfm	standard cubic feet per minute
FQI	flow totalizer indicator	TI	temperature indicator
iwc	inches of water column	TT	temperature transmitter
KO	knock out tank	VI	vacuum indicator
PI	pressure indicator	VIT	vacuum indicating transmitter
PID	photo-ionization detector	VPGAC	vapor phase granular activated carbon
		VSP	vapor sample port

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Attachment C-3.3. System Long-Term General System Operating Parameter Form, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Parameter		Blowers Effluent Air Flow			Total Effluent Flow Rate	Total Effluent PID	Heat Exchanger Influent Temperature
Instrument ID		FE ⁽¹⁾			FE ⁽¹⁾	VSP-601	TI-601
Location		BL-200 Effluent	BL-300 Effluent	BL-400 Effluent	Combined Effluent	Combined Effluent	Combined Effluent
Units		(scfm)			(scfm)	(ppmv)	(F)
Recorder Initials	Date / Time						

Parameter	Total Effluent Pressure	VPGAC Influent Temperature	VPGAC Effluent PID
Instrument ID	PIT-601	TI-602/TT-602	VSP-602
Location	Combined Effluent	Combined Effluent	Combined Effluent
Units	(iwc)	(F)	(ppmv)

Note:

- The blower and total effluent air flow rates are to be measured using a hand-held anemometer.

Abbreviations:

BL	blower	PIT	pressure indicating transmitter
F	degrees Farenheit	ppmv	parts per million by volume
FE	flow monitoring element access point	scfm	standard cubic feet per minute
FQI	flow totalizer indicator	TI	temperature indicator
iwc	inches of water column	TT	temperature transmitter
KO	knock out tank	VI	vacuum indicator
PI	pressure indicator	VIT	vacuum indicating transmitter
PID	photo-ionization detector	VPGAC	vapor phase granular activated carbon
		VSP	vapor sample port

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Attachment C-4

Conditional Approval Letter for
Discharge to POTW



COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS
1194 Prospect Avenue
Westbury, New York 11590-2723

October 16, 2007

Mr. John Cofman
Northrop Grumman Corporation
Eastern Region
600 Grumman Road West
Bethpage, New York 11714-5000

Re: Discharge IRM Condensate Water
Northrop Grumman, OU3 Site, Bethpage, New York

Dear Mr. Cofman:

This letter is in response to your letter dated September 6, 2007, requesting approval to discharge condensate water from a soil gas remediation system to be installed at Bethpage Community Park in Bethpage, as part of a New York State Department of Environmental Conservation Order on Consent. The requested discharge would be for approximately 300 gallons per month, an anticipated concentration of total volatile organics (VOCs) of 100 parts per billion (ppb) and for a discharge period of several years.

The request is hereby conditionally approved. The condensate water collected from the soil gas system will be collected by an air-moisture separator and discharged to the County's sanitary sewer on a monthly basis. All discharged water must have a Total Volatile Organics level not to exceed 1 part per million (ppm). In order to confirm the quality of the discharge, the first three months (3) months of condensate water collected will be analyzed for volatile organics (VOCs), EPA method 8260; depending on the consistency of the first three (3) months of water quality data a long term monitoring schedule will be established. A monthly summary of the volume discharged and water quality will be forwarded to the address provided below. The location for the discharge of these wastewaters will be into the sanitary sewer intake located on the Northrop Grumman property. At no time will the water be discharged at a rate to exceed 100 gallons per minute (gpm).

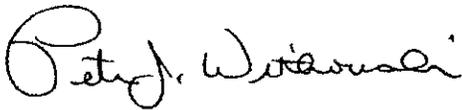
This Department reserves the right to cancel this temporary approval at any time. In accordance with requirements of this Department, a disposal fee of \$500.00 shall be assessed for a one year discharge period. A check in the amount of \$500.00, made payable to the "Nassau County Treasurer" must be remitted, in advance to:

Nassau County Department of Public Works
Cedar Creek Water Pollution Control Plant
3340 Merrick Road
Wantagh, New York 11793-4341
Attn: Peter J. Witkowski

Mr. John Cofman
Re: Discharge IRM Condensate Water
Northrop Grumman, OU3 Site, Bethpage, New York
October 16, 2007
Page 2

If you have any questions concerning the above matter, please call me at (516) 571-7352.

Very truly yours,



Peter J. Witkowski
Director of Hazardous Waste Services

PJW:jld

- c. Joseph L. Davenport, NCDPW
Richard Cotugno, NCDPW